

badly ventilated apartments; these predominant evils occupy a considerable share of the attention of the scientific and legislating classes of society. We shall therefore proceed to describe the nature of our improvements, and begin by remarking that there are few who dispute the propriety and advantage of imitating nature as far as possible in works of art, and especially in such operations as ventilation: where we can render any particular natural law available to our service, to take advantage of it both for the sake of economy and effect. How far this has been accomplished in the present instance remains to be seen.

It is a well-known law, that when an elastic body impinges upon a firm plain surface, the angle of reflection is equal to the angle of incidence. Referring to fig. 1, which is a section of a roof suitable for being fixed on the top of a chimney or flue, or by being prolonged, to form a ventilating ridge for a church or other public building, it will be observed that this roof is formed of a series of surfaces inclined more or less from the perpendicular, of which those below form a less angle than those at the top, being in regular gradation in this respect from bottom to top.

When the wind blows against the roof, as it impinges upon the lower plain, it would be reflected upwards upon the under surface of the second reflector or plain surface, from thence on to that on the opposite side, where it is deflected downwards outside. When the wind blows against the roof, or cover, an upward current is produced, and even a wind falling perpendicularly will actually facilitate the upward draught.

It is a known fact, and one which admits of being easily illustrated, that when a very small stream of air or other fluid is propelled amongst a body of the same, it carries a very extended current along with it, which arises from the friction of the particles or atoms of the air in motion against that at rest. In the case now before us the friction produced by the wind, or current passing through, takes along with it that with which it comes in contact in the cover, causing a partial vacuum or rarefaction of the air in that part; and which cannot be supplied by a portion of that passing in at the entrance side of the cover, because it comes with an acquired velocity sufficient to carry it through, and therefore the partial vacuum must be supplied from that in the chimney or shaft, but as the action of the wind is constant, so the upward current is also constant. It is then upon the application of these principles, namely, the reflection of elastic bodies from plain surfaces at the same angle at which they impinge thereon, and the effects of friction, which is produced between one current of atmospheric air in passing over another, that the present improvements are carried out; it is upon the proper arrangement of the reflecting surfaces that the whole success depends; this being attained, there is no need for any mechanical arrangements such as require to be kept in constant motion, and are therefore subject to being speedily worn out, neither is there necessity for the application of any costly prime moving power which would be the source of increased expenditure. These covers, or roofs, are quite sufficient to create an upward current where they are exposed to the wind, and have been already found fully equal to any thing here reported of them; they are susceptible of great variety of form either as roofs or covers, and may be combined with almost any of the present known forms, such as the lobster back, the malt-house cowl, &c., and it may be here remarked that one great peculiarity of this ventilating covering is, that however light the wind may be, still its action must be favourable, whereas, in almost all if not in every one of its forms heretofore in use, when the wind is light they are found in their most unfavourable position, or their action ceases to be effectual. For the ventilation of ships and carriages this top is peculiarly applicable, and when provided with a valve, a downward current can be produced with equal facility. By using two of these tops, one for producing a downward current, and another for the upward current, a ship may be most effectually aired and ventilated in either hold or cabin.

To prove the efficacy of these coverings, if a piece of flammable substance in a smouldering

state be put in the bottom part of the ship, allowing room for the admission of air, the moment that a current of air is projected against the reflectors, the smouldering substance is brought into a flame from the upward current produced; the same will be the case when we blow right down upon it.

Fig. 2. The dotted lines in this sectional figure shew the course that would be followed by the wind in passing through the roof were each separate atom of the atmosphere coming at an interval apart from that preceding it; but as this is not the case, the atoms being in immediate juxtaposition, the resultant of these dotted lines will be in the direction indicated by the arrows, which has a tendency to create a partial vacuum in the upper part of the lowest chamber (a) of the roof, and thereby causes an upward draught in the shaft over which it is placed.

Fig. 3 is a section of a roof for producing a downward current in any shaft, flue, or opening over which it may be placed, when that is desired. For this purpose it is furnished with a valve (b) attached by a screw to the lower deflector on one side. When this valve is put up in the position represented, the current of atmosphere is thereby made to follow the course marked out by the arrows.

Fig. 4 has this valve put on in a permanent manner. Both these are peculiarly applicable to the ventilation of ships, and such places as are so circumstanced as to require the purer air to be taken in from an elevated situation.

Fig. 5 is expressly designed for shipping; the fresh air is admitted on the one side, the vitiated is ejected from the other; the two valves in the centre are hinged with their edges closely together, and may be put over to any side of the roof at pleasure by means of the cords represented by the dotted lines. The arrows shew the action in the position in which they are represented.

Fig. 6 is an exemplification of light-house ventilation, with fixed roofs, the action of which will be sufficiently obvious from the previous description.

Fig. 7 illustrates the application of the ventilating roof or ridge to a church or other public building.

HOUSES AND PEOPLE DESTROYED BY MUD.

THE *Quarterly Geological Journal* gives the following account of a remarkable torrent of mud, translated from a newspaper lately received from Colombia. The facts are attested officially by the local authorities. The first extract is a simple translation of an account dated "Tasajeras, Friday, February 21, 1845," and signed "R. J. Treffery."

"On Wednesday, the 19th instant, a little before seven, a.m., there was heard a great noise in the plain of the river Lagunilla,* and at the same time an earthquake took place. Immediately there appeared in the strait or ravine in the mountains from which the river Lagunilla arises, an immense flood of liquid clay, which pursued its course with the greatest rapidity through the whole plain on both sides of the river, carrying away woods of tall trees like straw, rolling them away, and covering them in such a manner as to leave no sign of there having been a wood at all. The same happened with regard to the houses and cottages which it met with in its course, overwhelming them with their inhabitants, and carrying away and burying those unhappy persons who were fleeing from death, so that nearly all the population of the higher part of the valley has been destroyed, and many who had escaped from the torrent and gained some high or enclosed place have found themselves insulated, and have perished by famine. It was quite impossible to succour them, for the whole plain was covered with a layer of mud and sand, so deep that no one could pass without being swallowed up. Some few persons, however, found an asylum by being near the edge of the torrent, and saved themselves by roads formed of the branches of trees."

The space of land covered may be estimated at from four to six leagues; and the quantity of matter poured down at 250 millions of tons.

* The Lagunilla is a small stream emptying itself into the river Magdalena, and situated in the north-western extremity of South America, in New Granada. Itagua, the town alluded to in the subsequent document, is some distance to the west of Santa Fé de Bogotá.

LEAD PIPES.

WE copy from *The Medical Gazette* the following statement relative to the deleterious effects of water impregnated with carbonic acid passing through lead pipes. It is written by Mr. Rust, of Windsor, who was consulted on the respective cases:—

"On the 23rd of last April a labourer, residing at Ascot, and employed by Mr. Hibbard, clerk of the race-course there, applied to me at the dispensary at Windsor, evidently suffering from the poisonous effects of lead; his complexion was sallow, and he was constantly suffering from severe pain in his bowels, attended with flatulence. He had the dark blue mark round the gums, so peculiar to those who are suffering from the deleterious effects of that metal. On inquiry I found that his children had been in bad health since they had lived at Ascot, and that they had become weak and sallow, and had suffered from pains in their bowels, and indigestion, and that he had sent one of the most affected away, believing that the air of the house was prejudicial to their health. I immediately asked him if the water he drank, and used for cooking, passed through lead, and was answered in the affirmative. I procured a quantity of it, and, on the addition of water impregnated with sulphuretted hydrogen, a large precipitate of sulphuret of lead was thrown down. By the use of other water, and of appropriate remedies, the principal of which was slum, he is slowly recovering.

In November, 1842, one of the whippers-in at the royal kennel at Ascot, applied to me, suffering from lead palsy, after a severe attack of colic during the previous summer, which was believed to have been inflammation of the bowels. Having previously met with similar cases, I felt convinced that lead was dissolved in the water which he had used for cooking and drinking; and, on inquiry, I found that disorders which could be attributed to the effects of lead had for a long time been prevalent in the establishment at the royal kennel, and that the dogs had for a long period suffered from a species of paralysis denominated kennel lameness. The water was in consequence analysed by Dr. Ryan, at the Polytechnic Institution, the results of which were as follows: Water at the spring head, specific gravity at 60 degrees, 1.018. The contents of an imperial pint, on evaporation to dryness, yielded 2.37 grains of solid matter. The solid contents of an imperial pint being—Chloride of sodium, 1.54 grains; chloride of magnesium, 0.71 grains; sulphate of lime, 0.128 grains; a trace of carbonic acid: total, 2.378 grains. The water, after it had passed through the leaden pipes, was found to contain .164 grains of carbonate of lead in an imperial pint, or one and a third of carbonate of lead in an imperial gallon.

Soon after I had treated the case of the whipper-in, a young man, Richardson, from East Hampstead, applied to me, with the worst form of lead palsy I had ever seen; this came on him when in service as footman in the family of Sir Willoughby Rooke, then inhabiting a mansion in the immediate vicinity of Ascot, and was attributed to drinking water contained in a leaden cistern. Recently I have seen other persons from the immediate vicinity of Ascot, suffering from various symptoms, which might be caused by lead, and, on inquiry, found that they were supplied by water which passed through the leaden pipes of pumps. I think it may be fairly deduced from the above facts, that the spring-water at Ascot contains a small portion of free carbonic acid, which dissolves portions of lead in passing over its surface, and it will readily account for the fact, that the leaden cisterns and pipes usually so innocuous, should occasionally produce such deleterious effects. The paralysis of the whipper-in was entirely removed by alum, combined with guaiacum, and Richardson was very much relieved by the same remedy. From the almost specific effects of alum in puerile colic (a disease I have been frequently called on to treat), I was induced to try whether it would be found serviceable in the paralysis produced by lead, and have on many instances found it of the greatest service, although in many more it has been useless."

BRITTON TESTIMONIAL.—The subscription lists are still open, nor have the committee yet determined on the nature of the testimonial.